

What is claimed is:

1. A device to space vertebral members comprising:

a first member having an interior side with a first angled section and an exterior side with a first contact surface;

5 a second member having a second interior side and a second exterior contact surface;

a third member positioned between the first member and the second member, the third member having a first side with a second angled section positioned towards the first angled section, and a second side positioned towards  
10 the interior surface of the second member;

the device positionable between a first orientation with the first angled section disengaged from the second angled section and having a first height extending between the first contact surface and the second contact surface, and a second orientation having the first angled section engaged with the second  
15 angled section and having a second height between the first contact surface and the second contact surface, with the second height being greater than the first height.

2. The device of claim 1, having sidewalls that extend outward from the first  
20 contact surface to partially extend around the third member.

3. The device of claim 1, wherein the first contact surface and the second exterior contact surface are substantially parallel in the first orientation.

25 4. The device of claim 1, wherein the first contact surface and the second exterior contact surface form an acute angle in the second orientation.

5. The device of claim 1, wherein each of the first member, second member, and third member have a curved configuration.

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6. The device of claim 1, wherein the second member second interior side and the third member second side are both substantially flat.

5 7. The device of claim 1, further comprising a locking mechanism extending outward from the third member and having at least one extension that mounts within an aperture in the second member when the device is positioned at the second orientation.

10 8. The device of claim 7, wherein the locking mechanism further comprises a biasing member to force a cap outward and into the aperture when the device is in the second orientation.

15 9. The device of claim 1, wherein the first member further comprises a first platform adjacent to the first angled section, and the third member further comprises a second platform adjacent to the second angled section, the first platform and second platform being in contact when the device is positioned in the second orientation.

20 10. The device of claim 9, wherein the first platform is substantially parallel with the first contact surface and the second platform is substantially parallel with the second exterior contact surface.

25 11. The device of claim 1, further comprising additional angled sections in both the first member and the third member, the additional angled sections being disengaged in the first orientation and engaged in the second orientation.

30 12. The device of claim 1, further comprising an elongated delivery device pivotally connected to the second member, the second member being movable relative to the delivery device to adjust an angle relative to the delivery device.

13. The device of claim 12, wherein the angle of the second member relative to the delivery device ranges from about 10° to about 110°.

5 14. The device of claim 12, further comprising a disengagement means for removing the delivery device from the second member.

10 15. The device of claim 1, further comprising live pivots mounted on a distal end of a delivery device and being movable between a first position in which the live pivots extend outward from the delivery device to mount onto one of the members and a second position in which the live pivots are retracted to dismount one of the members from the delivery device.

15 16. The device of claim 12, further comprising a means for adjusting the angle of the second member relative to the delivery device.

20 17. The device of claim 12, further comprising a deployer operatively connected to the delivery device, the deployer moves the third member relative to the first member to adjust the position of the device between the first orientation and the second orientation.

25 18. The device of claim 17, wherein the deployer includes a cam extending along the delivery device and having a distal end that contacts and moves the third member relative to the first member.

19. The device of claim 17, further comprising a lock to maintain the position of the third member relative to the first member.

20. A device to space vertebral members comprising:

a first member having a first side and a second side with a receiving surface angled relative to the first exterior contact side;

5 a second member having a second exterior contact side and a second interior side with a deploying surface angled relative to the second exterior contact side;

10 the second member being movable relative to the first member between a first position with the deploying surface disengaged from the receiving surface, and a second position with the deploying surface engaged with the receiving surface, a height measured between the first exterior contact side and the second exterior contact side being greater in the second position than in the first position.

15 21. The device of claim 20, wherein the second member is positioned towards a proximal end of the first member in the first position, and positioned towards a distal end of the first member in the second position.

20 22. The device of claim 20, further comprising a first platform positioned adjacent to the receiving surface and a second platform positioned adjacent to the deploying surface, the first platform being spaced from the second platform in the first position and in contact in the second position.

25 23. The device of claim 22, wherein the first platform is substantially parallel with the first side, and the second platform is substantially parallel with the second exterior contact side.

30 24. The device of claim 20, further comprising a deploying mechanism operatively connected to the second member, the deploying mechanism moves the second member relative to the first member.

25. A device for spacing vertebral members comprising:

a first member having opposing first and second sides, the first side having first and second receiving ramps;

5 a second member adjacently positioned with the first member and having opposing third and fourth sides, the third side having first and second deploying ramps and facing towards the first and second receiving ramps;

10 the second member being movable relative to the first member between a first orientation which the first and second deploying ramps positioned from the first and second receiving ramps and a second orientation with the first and second deploying ramps positioned against the first and second receiving ramps, with a distance between the first member second side and the second member fourth side being greater in the second orientation than in the first orientation.

15 26. The device of claim 25, wherein the first and second members each include a proximal end that are aligned in the first orientation, and offset in the second orientation.

20 27. The device of claim 25, wherein the first and second receiving ramps are angled an equal amount relative to the second side.

28. The device of claim 25, wherein the first and second receiving ramps are angled different amounts relative to the second side.

25 29. The device of claim 25, wherein the first and second deploying ramps are angled an equal amount relative to the fourth side.

30. The device of claim 25, wherein the first and second deploying ramps are angled different amounts relative to the fourth side.

31. The device of claim 25, further comprising a third member positioned adjacent to the second member and away from the first member, the third member having a fifth side with sidewalls that define a receiving portion in which the second member is positioned with the fifth side being in contact with the fourth side of the second member.

32. A device to space vertebral members comprising:

first member and second member each having an exterior side and an interior side, the interior sides having ramped surfaces positioned at an angle relative to the exterior sides;

a delivery device connected to at least one of the first and second members having an elongated shape to position the device between the vertebral members; and

a deployer operatively connected to one of the first and second members to give movement of the first member relative to the second member between a first position with the ramped surfaces being disengaged, and a second position with the ramped surfaces engaged, a height measured between the exterior sides being greater in the second position than in the first position.

33. The device of claim 32, wherein the delivery device is pivotally attached to the at least one of the first and second members to adjust the angle of the first and second members relative to the delivery device.

34. The device of claim 33, wherein the delivery device further comprises live pivots movable between a connected position that extend outward from the delivery device for connecting to the at least one of the first and second members, and an unconnected position that retract within the delivery device to remove the first and second members from the delivery device.

35. The device of claim 32, wherein the delivery device further comprises a flexible sleeve having a first section spaced a predetermined distance from a second section with an extension mounted at a distal end to attach to the spacer.

5 36. The device of claim 35, further comprising a releasable sleeve having a width less than the predetermined distance such that when the releasable sleeve is positioned over the flexible sleeve, the first section is spaced an amount less than the predetermined distance to disengage the extension from the spacer.

10 37. A device to space vertebral members comprising:

a spacer having a first section with a first ramp and a second section with a second ramp, the spacer positioned between a closed orientation and an open orientation;

15 an elongated delivery device mounted to the spacer and having a first shaft attached to the first section and a second shaft operatively connected to the second section, the second shaft movable relative to the first shaft such that a distal end contacts the second ramp to move the second ramp from the closed orientation with the first ramp disengaged from the second ramp, to the open orientation with the first ramp in contact with the second ramp, the spacer having  
20 a larger width in the open orientation than in the closed orientation.

38. The device of claim 37, wherein the second shaft is positioned within the first shaft.

25 39. The device of claim 37, wherein the second ramp further comprises a lug having a contact surface that is contacted by the distal end of the second shaft.

40. The device of claim 37, wherein the first shaft comprises outwardly extending extensions that mount within apertures in the first ramp.

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41. The device of claim 37, further comprising means for disconnecting the extensions from the apertures to remove the spacer from the delivery device.

42. A device to space vertebral members comprising:

5           a spacer having a first section with a first ramp and a second section with a second ramp, the spacer positioned between a closed orientation with the first ramp disengaged from the second ramp and an open orientation with the first ramp in contact with the second ramp, with a width of the spacer being greater in the open orientation than in the closed orientation, the spacer further comprising  
10 an aperture; and

          an elongated delivery device that attaches to the spacer and having a extensions that are positionable between a first configuration that extend outward from the delivery device and mount within the aperture, and a second configuration that are retracted inward and dismount from the aperture.

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43. The device of claim 42, wherein the delivery device comprises a pair of outwardly facing ramped surfaces spaced a first distance apart in the first configuration, and a release sleeve movably positioned on the delivery device and having a height less than the first distance.

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44. The device of claim 43, wherein the extensions are positioned between the distal end of the delivery device and the ramped surfaces.

45. The device of claim 44, further comprising a pushrod positioned between the  
25 ramped surfaces and being axially movable along the delivery device.



46. A device to space vertebral members comprising:

an acting member having an exterior acting side and an interior acting side, the interior acting side having an acting ramp angled relative to the exterior acting side;

5 a second member having an interior supporting side and an exterior second side;

a deploying member positioned between the acting member and the second member, the deploying member having a first deploying side facing the acting member and a contact side being in contact with the interior supporting side of the second member, the first deploying side having a deploying ramp  
10 angled relative to the contact side;

a delivery device having an elongated shape with a first end pivotally connected to the deploying member to adjust an angular position of the deploying member relative to the delivery device,

15 a shaft axial movable along the delivery device and being operatively connected to the deploying member, the shaft being movable between a first orientation to position the deploying member with the deploying ramp being disengaged from the acting ramp and a second orientation with the deploying ramp being engaged with the acting ramp.

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47. A method of spacing vertebral members comprising the steps of:  
placing a spacer between the vertebral members, the spacer being in a  
first orientation and having opposing exterior sides distanced at a first height; and  
moving a first ramped surface within the spacer relative to a second  
5 ramped surface within the spacer to a second orientation and separating the  
opposing exterior sides to a second height that is greater than the first height.

48. The method of claim 47, further comprising contacting a first platform surface  
in contact with a second platform surface in the second orientation.

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49. The method of claim 47, further comprising moving the first ramped surface  
from a proximal end of the spacer in the first orientation to a distal end of the  
spacer in the second orientation.

15 50. The method of claim 47, further comprising detaching a delivery device from  
the spacer by moving a release sleeve along the delivery device and forcing  
opposing ramped surfaces inward to retract extensions inward to dismount from  
the spacer.

20 51. The method of claim 47, wherein the step of moving the first ramped surface  
within the spacer relative to the second ramped surface comprises pushing one  
of the first ramped surfaces or the second ramped surfaces with a cam.

25 52. The method of claim 47, further comprising detaching a delivery device from  
the spacer by rotating a cam within the delivery device and retracting live pivots  
inward.

53. A method of spacing vertebral members comprising the steps of:

positioning a spacer between the vertebral members while in a first orientation with a first ramped surface of a first member disengaged from a second ramped surface of a second member;

5 applying a pushing force to the first member;

moving the first member from a proximal position towards a distal position and engaging the first ramped surface with the second ramped surface; and

separating exterior sides of the spacer from a first distance in the first orientation to a second greater distance when the first ramped surface is

10 engaged with the second ramped surface.

54. The method of claim 53, wherein the step of applying the pushing force to the first member comprises contacting the first member with a cam that extends along a delivery device.

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55. A method of spacing vertebral members comprising the steps of:

positioning the spacer between the vertebral members in a closed orientation with a third member positioned between a first member and a second member;

20 pushing the third member from a proximal position towards a distal position;

engaging a first ramped surface on the first member with a second ramped surface on the third member as the third member moves from the proximal position towards the distal position; and

25 expanding a width of the spacer.

56. The method of claim 54, further comprising increasing the width of the spacer by moving the third member towards the distal position.

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57. A method of spacing vertebral members comprising the steps of:

attaching a spacer to a delivery device;

manipulating the delivery device and positioning the spacer between the vertebral members;

5        deploying a pushrod through the delivery device with a distal end of the pushrod contacting a first member of the spacer;

      moving the first member of the spacer from a proximal position towards a distal position; and

      engaging a first ramped surface on the first member with a second  
10 ramped surface on a second member of the spacer as the first member moves from the proximal position towards a distal position and increasing a width of the spacer.

58. The method of claim 57, wherein the step of attaching a spacer to the  
15 delivery device comprises attaching pivots on the delivery device to apertures within the spacer.

59. The method of claim 58, further comprising detaching the pivots from the apertures by rotating the pushrod within the delivery device such that a smaller  
20 section of the pushrod is aligned with the pivots and the pivots retract within the apertures.

60. The method of claim 57, wherein the step of attaching a spacer to the delivery device comprises attaching extensions on a distal end of a first tube to  
25 apertures within the spacer.

61. The method of claim 60, further comprising detaching the extensions from the apertures comprises moving a release sleeve along the first tube and squeezing first and second arms together and reducing a distance between the  
30 extensions.